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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

STAHL, MICHAEL J

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 09/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/681,019

Applicant(s)

ODA ET AL.

Examiner

Mike Stahl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2006.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-11,13-22,24-33 and 35-40 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,2,6-11,15-19,22,26-33 and 37-40 is/are rejected.
7) ☒ Claim(s) 4,5,13,14,20,21,24,25,35 and 36 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 13, 2006 has been entered. The claims as appearing in the amendment filed June 7, 2006 are now active and are treated in this action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 10-11, 15-16, 18, 30, 33, 37-38, and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimada et al. (US 6201226).

Claim 10: Shimada discloses a mirror comprising a gold layer 7, wherein said gold layer has a reflection surface plane and a contact plane, an angle between the reflection surface plane and the contact plane is equal to an angle between the (100) and (111) plane orientations in a silicon crystal, and the mirror has an interior concave portion adjacent to the reflection surface plane which is filled with a non-atmospheric material (a layer 8 of indium tin oxide). See figs.

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3A-3G. It is noted that the gold layer 7 conforms in part to the outer surface of a quadrilateral pyramid (see top view of 5 in fig. 2A and col. 6 lns. 41-43).

Claim 11: The mirror comprises a gold film 7.

Claim 15: The mirror has a shape of a pyramid in which both ends are cut down.

Claim 16: The reflection surface plane is flat.

Claim 18: The mirror further includes a connection film portion which is orthogonal to an optical axis.

Claim 30: Shimada discloses an optical circuit having the claimed mirror structure as described above, and further having a substrate 21 to which the mirror is connected, an optical waveguide 28 provided for the substrate, and a photodiode 19 (shown in figs. 5 and 9A) provided for the substrate.

Claims 33, 37-38, and 40: See above with regard to claims 11, 15-16, and 18.

Claims 1-2, 6-11, 15-19, 22, 26-30, 33, and 37-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Makiuchi (US 5701374, cited on previously mailed PTO-892 form).

Claim 1: Makiuchi discloses a mirror comprising a multi-layer thin film 23C having first and second layers, wherein the first layer has a reflection surface plane, the second layer has a contact plane with a substrate, and an angle between the reflection surface plane and the contact surface plane is equal to an angle between the (100) and (111) plane orientations in a silicon crystal, and the mirror has an interior concave portion adjacent to the reflection surface plane which is filled with a non-atmospheric material (the material of substrate 23). See fig. 5. It is noted that layer 23C is a laminate of Ti, Au, Sn, and Au layers (col. 8 lns. 18-22). The interior

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concave portion is interpreted as including the region through which the dashed rays in fig. 5 travel.

Claim 2: The mirror comprises a gold film.

Claim 6: The mirror has a shape of a pyramid.

Claim 7: The reflection surface plane is flat.

Claim 8: In a related embodiment (fig. 9), the reflection surface plane may be a curved recess surface (col. 11 lns. 1-5).

Claim 9: The mirror further includes a connection film portion which is orthogonal to an optical axis.

Claims 10-11 and 15-18: The limitations of these claims are met by the Makiuchi device described above with regard to preceding claims.

Claims 19 and 30: Makiuchi discloses an optical circuit having the claimed mirror structure as described above, and further having a substrate **21** to which the mirror is connected, an optical waveguide **22** provided for the substrate, and a photodiode **20** provided for the substrate (fig. 5).

Claims 22, 26-29, 33, and 37-40: The limitations of these claims are met by the Makiuchi device described above with regard to preceding claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US 6201226) in view of Miyazaki et al. (US 5187367).

Claim 31: Shimada discloses that the substrate includes a cantilever and that the mirror is installed in a tip portion of the cantilever, but does not disclose the recited expanding/contracting member to move the tip portion up and down. Miyazaki discloses a cantilever probe similar to that of Shimada, the probe including a member **305/305'** which expands or contracts to move the cantilever up or down (figs.7A-8B). The purpose of enabling movement of the cantilever is to control the distance between the probe and a sample (col. 1 ln. 63 – col. 2 ln. 11). Shimada also recognizes a need to control this distance (col. 5 ln. 61 – col. 6 ln. 10). Accordingly, it would have been obvious to a skilled person to have incorporated the expanding/contracting member taught by Miyazaki into the Shimada device in order to provide more direct control over the position of the cantilever tip.

Claim 32: The member **305/305'** suggested by Miyazaki is a piezoelectric element.

Claims 17 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US 6201226) in view of Shimada et al. (US 5923637).

Shimada '226 does not disclose that the reflection surface plane is a curved recess surface. Shimada '637 discloses a similar probe which is formed to have a curved recess surface (fig. 3), and teaches that this shape resists deformation upon contact with a sample surface (col. 10 lns. 23-27). Since the probe of Shimada '226 may contact a sample, it would have been obvious to a skilled person to have formed the probe in Shimada '226 with the general shape suggested by Shimada '637 in order to avoid deformation of the probe.

Allowable Subject Matter

Claims 4-5, 13-14, 20-21, 24-25 and 35-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 4-5, 13-14, 24-25, and 35-36 call for the non-atmospheric material to be a particular kind of resin. The Makiuchi and Shimada '226 references fail to teach or suggest the use of resin as a non-atmospheric material as interpreted in the above rejections, and instead use indium tin oxide or indium phosphide respectively. As to claims 20-21, Makiuchi is the only reference applied to base claim 19 in this action. However, Makiuchi fails to teach or suggest including a cantilever in the substrate.


Response to Amendment

The amendments to the independent claims distinguish over the previously applied Albrecht et al. and Shimada '637 references, so the rejections based on those references taken alone have been withdrawn. Although it was indicated in the advisory action mailed June 29, 2006 that the amendment would distinguish over both Shimada references, it has been found upon further review that Shimada '226 remains applicable to certain claims (as set forth in the rejection above).

Conclusion

Inquiries about this letter should be directed to Mike Stahl at 571-272-2360. Inquiries of a general or clerical nature (e.g., a request for a missing form or paper, etc.) should be directed to the technical support staff supervisor at 571-272-1626. Official correspondence which is eligible for submission by facsimile and which pertains to this application may be faxed to 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Questions about the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Stahl *MSS*
Patent Examiner
Art Unit 2874
September 17, 2006


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